

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-42 are pending in the present application. Claims 9 and 26 have been amended to correct the noted typographical error. It is respectfully submitted that no new matter is added by this amendment.

In the outstanding Office Action, the specification and claims were objected to due to minor informalities; Claims 1-8 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-3, 5, 7 and 10-12 respectively of U.S. Pat. No. 6,708,014 (hereafter '014); Claims 9-42 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-10, 12-17, 19-21, 23, 25 and 27 of '014 in view of Eklund et al. (U.S. Pat. No. 6,175,717; hereafter Eklund); Claims 9, 14, 26 and 31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Eklund in view of Hotomi et al. (U.S. Patent No. 5,027,157; hereafter Hotomi); Claims 10, 25, 27 and 42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Eklund in view of Hotomi as applied to claims 9 and 26 above, and further in view of Badesha et al. (U.S. Pat. No. 5,848,327; hereafter Badesha); Claims 10-13 and 27-30 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Eklund in view of Hotomi as applied to claims 9 and 26 above, and further in view of Parker (U.S. Pat. No. 5,729,807) and Badesha; Claims 20 and 37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Eklund in view of Hotomi as applied to claims 9 and 26 above and further in view of Lestrangle (U.S. Pat. No. 6,219,515); Claims 22 and 39 were rejected under 35 U.S.C. § 103 (a) as begin unpatentable over Eklund in view of Hotomi as applied to claims 9 and 26 above and further in view of Hosoya et al. (U.S. Pat. No. 4,598,991; hereafter Hosoya).

In response to the objection to the specification and Claims 9-42 as including minor informalities, the specification has been amended as suggested by the Examiner on page 2, paragraph 1 of the Office Action mailed June 10, 2004, and Claims 9 and 26 have been amended as suggested by the Examiner on page 2, paragraph 2 of the Office Action mailed June 10, 2004. Therefore, it is respectfully requested that the objection to the specification be withdrawn.

Regarding the rejection of Claims 1-8 and 9-42 under the judicially created doctrine of double patenting over Claims 1-3, 5, 7, and 10-12 and Claims 1-10, 12-17, 19-21, 23, 25 and 27 of U.S. Patent No. 6,708, 014, respectively, filed herewith is a suitably executed Terminal Disclaimer in compliance with 37 C.F.R. 1.321(c) referencing commonly-owned U.S. Patent No. 6,708,014. The filing of this terminal disclaimer is not an admission of the propriety of the rejection, but simply serves the statutory function of removing the rejection of double patenting, and raises neither a presumption nor estoppel on the merits of the rejection. *Quad Environmental Technologies Corp. v. Union Sanitary District*, 946 F.2d 870, 20 USPQ2d 1392 (Fed. Cir. 1991).

Before turning to the outstanding art rejections, it is believed that a brief review of the invention would be helpful. The present invention relates to a development device and image forming apparatus including an electrostatic transportation device which moves fine particles, "wherein a width of each of the electrodes in a traveling direction of the fine particles is set to be in a range of 1 time to 20 times an average particle diameter of the fine particles, a pitch between the electrodes in the traveling direction of the fine particles is set to be in a range of 1 time to 20 times the average particle diameter of the fine particles." The inventors have studied electrostatic transportation devices and found through their own inventive efforts that to achieve stable transportation of toner particles it is necessary to achieve matching between

the toner and the charging member in the apparatus since the toner particles differ in size and shape.

The transporting efficiency and hopping efficiency of the development device is highly dependent on the electrode width L and electrode interval R illustrated in the non-limiting example of Figure 1.¹ When the electrode width L is wide, the number of toner particles riding on the electrode increases and the number of toner particles moving over a large distance increases, which results in increased transporting efficiency. However, if the electrode width L becomes too wide the field intensity in the vicinity of the center of the electrode lowers and the toner particles adhere to the electrode, and the transporting efficiency is lowered.² The electrode interval R determines the field intensity between the electrodes based on a relationship between the distance and the voltage applied to the electrode. As interval R becomes smaller, the field intensity increases, and therefore, the initial speeds of transporting and hopping are easily obtained. However, in this situation the movement distance per time for one particle moving from one electrode to another electrode becomes short. Therefore, unless the driving frequency is high, the moving efficiency does not improve.³ Non-limiting Figures 6 and 7, illustrate the inventors own inventive efforts in determining the dependency of the transporting efficiency and hopping efficiency on the electrode width L and electrode interval R. As a result of these inventive efforts, the inventors have determined, as recited in Claims 9 and 26, that if “a width of each of the electrodes in a traveling direction of the fine particles is set to be in a range of 1 time to 20 times an average particle diameter of the fine particles, a pitch between the electrodes in the traveling direction of the fine particles is set to be in a range of 1 time to 20 times the average

¹ Applicants' specification, page 15, lines 1-10.

² Applicants' specification, page 15, line 16 to page 16, line 3.

³ Applicants' specification, page 16, lines 6-15.

particle diameter of the fine particle,” then transporting and hopping can be stably performed with an efficiently low voltage.⁴

With regard to the prior art rejections of independent Claims 9 and 26 under 35 U.S.C. §103(a), the rejection is respectfully traversed. Ecklund discloses an integrated toner transportation/toner charging device with a 75 μm wide electrodes separated by a distance of 75 μm . More specifically, Ecklund is directed towards overcoming difficulties resulting from the pigment of the toner and uniform delivery of the toner to the development zone using a fluidized bed as a combination toner storage and mixing reservoir.⁵ However, Ecklund does not mention the dependency of the transportation and hopping efficiency on the electrode width and distance between the electrodes. Hotomi discloses a developing device with electrodes for inducing a traveling wave on the developing material. Hotomi, discloses several embodiments of transporting toner particles with a particle size of 13 μm using a traveling wave. However, like Ecklund, Hotomi does not recognize or mention the dependency of the transportation and hopping efficiency on the electrode width and distance between the electrodes. Hotomi does not cure the deficiencies discussed above with respect to Ecklund. Therefore, neither Ecklund nor Hotomi, either alone or in combination teach, suggest, or even recognize the dependency of the transportation and hopping efficiency on the electrode width and distance between the electrodes. Further, none of the other cited references cure the deficiencies discussed above with respect to cited references Ecklund and Hotomi.

Further, the dependency of the transportation and hopping efficiency of an electrostatic transportation device is not obvious to one of ordinary skill in the art absent hindsight reconstruction using the Applicants' inventive efforts. The reviewing court for the PTO has recently re-emphasized that a core factual finding in a determination of patentability

⁴ Applicants' specification, page 20, line 9 to page 21, line 21.

⁵ Ecklund, column 8, lines 5-46.

cannot be based on conclusions as to what would be basic knowledge in the art, instead, concrete evidence must be produced. See In re Zurko, 59 USPQ2d 1693, 1697-98 (Fed. Cir. 2001). As further recently noted by the PTO reviewing court, the “case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation ‘[to combine]’ as an ‘essential evidentiary component of a obviousness holding.’” In re Dembiczak, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).

Accordingly, if the PTO continues to allege obviousness, it is respectfully submitted that it must abide by precedent and provide evidence of the various unsupported allegations presently relied upon. Absent the production of the above-noted concrete evidence, the case law requires the withdrawal of this rejection.

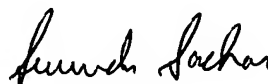
Further, the other cited references of Badesha, Parker, Lestrangle, and Hosoya have been considered, but do not cure the deficiencies as discussed above with respect to Ecklund and Hotomi.

Therefore, it is respectfully requested that the rejection under 35 U.S.C. §103(a) of independent Claims 9 and 26 be withdrawn. Likewise, it is respectfully requested that Claims 10-25 and Claims 27-42 that depend from parent Claims 9 and 26 are allowable for at least the reasons discussed above with respect to parent Claims 9 and 26.

Consequently, in view of the present amendment and in light of the above comments, no further issues are believed to be outstanding in this application, and the present application is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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